

XIX. *Illustrations of specific differences in the Saws of*
 ♀ *Dolerids*. By the Rev. F. D. MORICE, M.A.,
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PLATES XXIII-XXV.

HAVING found much pleasure and interest in the work of dissecting out, examining, and photographing at various magnifications, the terebrae of such European *Dolerids* as I have been able to procure (viz. in all thirty-six reputed species), I venture to offer to the Society a series of these photographs—the latest and so far as I can judge the least unsuccessful of many attempts which I have made in that direction, hoping that it may be of some service to any colleague who cares to occupy himself with the determination and classification of that admittedly difficult group of Sawflies.

The original photomicrograms here reproduced on a somewhat smaller scale were all taken at the same magnification (about $\times 240$), and as far as possible under the same conditions as to lighting, aperture of lens, time of exposure, etc. Possibly by “stopping down” more I could have brought out better certain details of these rather inconveniently “solid” (not flat) objects, but this, for other reasons, I was anxious to avoid. With the magnification employed I could only get a small portion of each saw into my quarter-plates; but this suffices to show pretty well the characters to which I propose to call attention, and with a lower magnification this would sometimes have hardly been the case.

The late Mr. Cameron has remarked that for separating *Dolerus* spp. “the form of the ovipositor can be safely relied upon, but it is not always easy of application.” With this, as the result of prolonged study of the subject, I quite agree. But it seems to me that mere *outlines* of the saws, such as are given in the Plates of his well-known Monograph, are not really of much use to students attempting to identify species by the characters of that organ. Such

a method of representation gives a very inadequate idea of the really very characteristic appearance under a good microscope of the objects in question. It is not merely in the *margins* of the saws that striking and useful characters are to be found. Others, to my mind quite as important, and often more immediately recognisable, occur in connection with the *surface* (not the *edge*) of certain saws, and especially with the remarkable alternating elevations and depressions ("ridges and furrows,") which invariably cross these surfaces diagonally, but must generally be ignored in an outline drawing.

For instance, if the reader will compare for a moment the first and last of my figures (Plate XXIII, fig. 1, and XXV, fig. 12), he will see, no doubt, that the saws shown in them *can* be distinguished by their *outlines* only, but that they can be much more rapidly and confidently separated by the great unlikeness of their *surfaces*. The former shows a surface crossed by corrugations, which are armed with most conspicuous teeth or spines; while in the latter there are also corrugations, but they are edentate and comparatively characterless.

Compare, again, figs. 1 and 5 of Plate XXIV, and it will be seen that though the *outlines* of their margins are not identical, a much more noticeable difference between the two saws is the presence in fig. 5 of great triangular tooth-like projections on the surface, which are altogether wanting in the other figure.

It appears to me that, taking them as a whole and considering all their characters, we can divide the saws here figured into certain more or less definite groups; which groups to some extent, but not altogether, correspond to subdivisions already pointed out by various authors as existing among these insects—subdivisions founded on external characters only and without any consideration of the structure of the saws.

For instance, figs. 1, 2, 3, and 4 of Plate XXIII are all extremely different from any of those which follow them; and three of them at least (2, 3 and 4) have a most peculiar and very similar common "facies" of their own—resembling perhaps a little the saws of a very different Sawfly genus, viz. *Tenthredopsis*, but quite unlike those of any other *Dolerids*. Now these figures represent four out of the five species (the fifth *genucinctus*, Zadd., is unknown to me) which were singled out by Thomson, mainly on

characters of the head (elongate eyes, etc.), to form his "Sectio I" of *Dolerus*, and they are now recognised by systematists as a separate genus, viz. *Loderus*, Konow.

Again, figs. 5, Plate XXIII, to 3, Plate XXIV refer to species which, because of the largely or entirely testaceous colour of the abdomen in all the ♀♀ and nearly all the ♂♂, were formerly considered distinct generically from the black-bodied *Doleri*, and called by Leach, Stephens, etc., *Dosytheus*. Now nearly every one of these insects has a saw exhibiting characters either of the surface, or the margin, or both, which—with two exceptions (Plate XXIII, figs. 4 and 5)—not one of the *Dolerus* spp. with black abdomen possesses! I do not suggest that these differences are so essential as to support the idea that *Dosytheus* should again be considered as a "good genus." Still it is interesting to find that in this group of insects a difference in the colour of the abdomen is so frequently correlated with a difference in the characters of the saw. And it is curious to note that on the other hand a difference in the colour of other parts of the body (*e. g.* in the thorax of the ♀♀ and in the legs of both sexes) seems to have no connection whatever with the characters of the saw. *Sanguinicollis* and *ravus* (Plate XXIV, 11 and 12), the former with, and the latter without, red on the ♀ thorax, have saws so identical in construction, as to make it highly probable that Konow was right in considering *ravus* as a var. of *sanguinicollis*. *Thoracicus*, another species with red on the thorax (Plate XXV, 12), is evidently most nearly allied to a group of entirely black spp. (Plate XXV, 6–11). Yet another such species, *haematodes*, has a saw much like those of the blue-black forms *anthracinus* and *nitens* (Plate XXIV, 6–8).

Finally, of the more or less red-legged species, the best known—*gonager*—has a saw hardly distinguishable from that of the black-legged *niger* (Plate XXV, 6, 7); whereas *puncticollis*—which Konow considered, but wrongly, I feel sure, as a var. of *gonager*—and another red-kneed insect *liogaster* (Plate XXV, 1, 2) have saws which seem to place them in the group of *aeneus*; and *gessneri* (Plate XXIV, 5) also with red on the legs has a saw unlike any of the species with similar external characters and allying it, I should say, quite unmistakably with the "Dosytheus" *dubius* (Plate XXIII, 10).

Even in cases, and of such there are many, where it

would be difficult, if not impossible, to say from the characters of its saw only to what species a given insect belongs, these characters will often suffice to show that at any rate it does *not* belong to some particular species. For instance specimens of *fumosus*, *oblongus*, etc. (Plate XXV), are often hardly distinguishable by external characters from one another, or from other members of the same group, or finally from *nigratus* (Plate XXIV, 10). But on examining the saw of such a specimen we shall sometimes be able to say at once that at any rate it is *NOT nigratus*! Thus these saw-characters, even where they do not absolutely bring us to a conclusion as to the species of a particular insect, may at least supply us with a preliminary "orientation" of our ideas on the subject. And, as in the cases quoted above of *gonager* and *puncticollis*, *sanguinicollis* and *ravus*, they may be helpful towards forming an opinion as to the desirability or otherwise of uniting two doubtfully conspecific forms.

I will now review shortly the saws here figured *seriatim*, pointing out such characters as I think noticeable in particular cases, and indicating the groups into which they appear to me most naturally to arrange themselves.

Of the *Loderus* spp. (Plate XXIII, 1-4) I have already spoken. *Palmatulus* and *vestigialis* are well-known and fairly common species. *Pratorum* I have figured from a specimen taken by myself at Woking. *Gilvipes* (= *ornatulus*, Knw.) is from a specimen given to me by Konow as *ornatulus*. A fifth palaeartic form (*genucinctus*, Zadd.) is very rare, and I have been unable to procure a specimen.

Passing to the species formerly distinguished as *Dosytheus* (Plates XXIII, 5 to XXIV, 3), I think it is possible to recognise among them four or five fairly distinct groups.

Etruscus and *bimaculatus* (Plate XXIII, 6 and 8) are evidently very closely allied by the quadrate form of the so-called saw-teeth,* and of the intervals or emarginations (almost as wide as themselves) which separate them.

Pratensis, *palustris* and *aericeps* (Plate XXIII, 5, 7, 9) form a group which has much in common with *etruscus* and *bimaculatus*, but the saw-teeth (if I may call them so under

* I should prefer to consider each of these so-called "teeth" as a *separate saw*, and confine the term saw-teeth to those minute denticulations of their edges which can be clearly seen in my Figure of *bimaculatus*, but are hardly to be recognised except as a very slight sinuation in *etruscus*.

protest) are (except a few at the apex) more elongate, not separated by such wide intervals, and much more conspicuously and intricately denticulated. Also the saw as a whole widens less rapidly from the apex towards the base. This is particularly noticeable in *aericeps*, in which the inferior and superior margins of the saw might almost be said to run parallel to each other. The corrugations crossing the blade diagonally are armed with sharp teeth in all these species, but the character is not so conspicuous in these as in certain other cases.

Anticus (Plate XXIII, 11) and *dubius* (Plate XXIII, 10) agree closely in the great development of tooth-like projections on the diagonal corrugations (a pair on each!), and also in the triangular not quadrate form of the so-called saw-teeth, and the large bold denticulation of their cutting edges. These characters belong also to *gessneri* (Plate XXIV, 5), a species whose saws are almost exactly like those of *dubius*, though it would not have been reckoned as a *Dosytheus* by the old authors since its abdomen is not testaceous but black! From both *dubius* and *gessneri* the saw of *anticus* is distinguishable at a glance, by the more projecting "teeth" and the wider intervals which separate their cutting edges, also by the humpy undulating apex of its superior margin—in which respects it resembles a good deal the group of *etruscus* and *bimaculatus*. (There is an indication of the same character in the saws of *pratensis*, etc., but it is much less developed there!)

The saw of *ferrugatus*, Lep. = *thomsoni*, Knw. (Plate XXIII, 12), is utterly unlike that of *anticus*, though in most external characters the two species resemble each other so closely that they are often confounded in collections. (Nearly all British specimens which have come to my notice under the name *anticus* really belong to *ferrugatus*; in fact, I have only once seen a real British *anticus*, which was captured by Mr. E. Atmore at King's Lynn.) I cannot place the saw of *ferrugatus* anywhere but in a group by itself. Compared with *anticus*, etc., it is curiously narrow, the denticulations of its cutting edges are numerous and distinct but very small, and the armature of its lateral corrugations is almost obsolete.

Triplicatus, *madidus* and *schulthessi* (Plate XXIV, 1, 2, 3) have extremely similar saws. In all three the corrugations appear to be edentate. The cutting edges

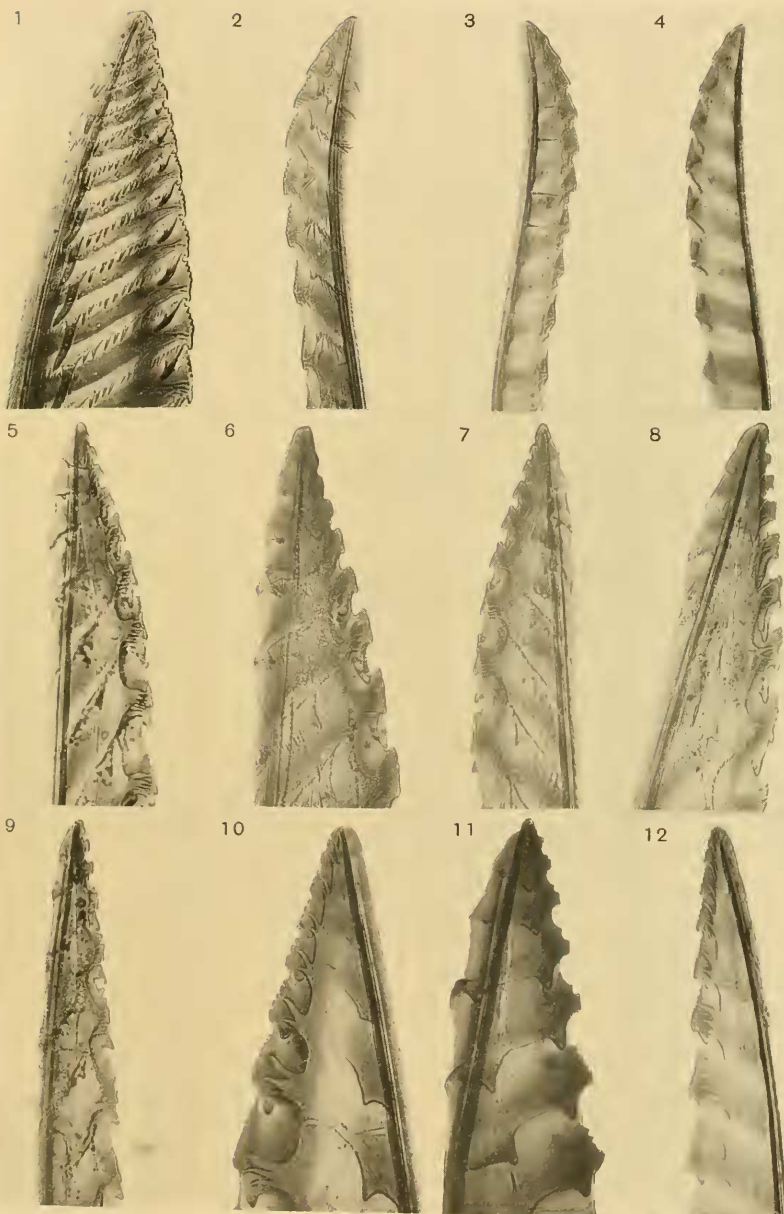
show numerous denticulations, large and conspicuous in *triplicatus* and *madidus*, less so in the other species. *Tinctipennis* (Plate XXIV, 4), though an entirely black insect, has a saw presenting so distinctly the characteristics of a *Dosytheus*, that, until I myself dissected a British specimen and found the saw here figured, I had always a suspicion that Cameron had made some mistake, and that the saw mounted by him in balsam (now in the S. Kensington Coll.) and figured in his Monograph, did not really belong to the insect to which he assigned it! No other black-bodied *Dolerus* has a saw in the least resembling it, and I can only group it (in spite of the insect's external characters) with those of *pratensis*, *aericeps*, etc.

We come now to a large group of species (Plates XXIV, 6 to XXV, 4 inclusive) whose saws are easily distinguished from any of those hitherto considered, but as a rule not at all easily distinguished from one another. The diagonal corrugations of the blade seem to be always quite simple—merely a series of alternate straight and equal ridges and furrows. The so-called teeth are always distinctly projecting, triangular (not quadrate) in outline and separated from each other by rather wide but not very deep sinuations or emarginations; those nearest the apex of the saw are hardly denticulated at all, but towards its centre a few distinct denticulations begin to appear, and still nearer the base they are often pretty numerous, but always very small and visible only with high magnifications. (Unfortunately, as already explained, I have been unable to include this part of the saws in my figures.) The superior margin of the saw is always simple, not lumpy at the apex; and it generally coincides with the long linear groove, etc. which connects together the saw and its "support." In some of my figures (*e. g.* Plate XXIV, 6 and 7) the presence of denticulations on the cutting edges of the organ can be detected without much difficulty, but in others I can only see them with the help of a magnifying glass, and in some I have not succeeded in making them visible at all. The general appearance of all these saws is pretty much the same; none of them are particularly wide or narrow or in any other way paradoxical. A few, however, by dint of considerable experience I can recognise at a glance—*e. g.* Plate XXIV, 11, 12 by their curved "falcate" shape, the superior margin distinctly sinuated

inwards! In Plate XXIV, 10, on the contrary, this margin is sinuated distinctly though not very conspicuously *outwards*. And in other cases, as a rule, it is practically a simple straight line. Plate XXV, 4 again (the common species *aeneus*, Htg. = *elongatus*, Thoms. Cam., etc.) I can always recognise by the evidently *concave* curvature of each of the cutting edges and their consequently small and acute-looking actual apices. In other cases, on the contrary (*e.g.* Plate XXIV, 9, XXV, 3, etc.), these cutting edges are either practically straight or slightly convex, and this makes their apices appear less prominent. But on the whole, though I can generally recognise a saw at once as either belonging or not belonging to this group, I should have to look to other characters, puncturation, sculpture of head and thorax, etc., before venturing to *name* the insect possessing it.

Picipes = *leucopterus*, Zadd. (Plate XXV, 5), is a saw which I can always identify by its curiously lumpy apex, combined with its convex, much denticulated (though the denticulations are very small), and very slightly projecting "teeth." This and the two next species (*gonager* and *niger*) seem to me more or less transitional between the last group (*aeneus*, etc.), and another which includes all my remaining figures (Plate XXV, 8 to 12 inclusive). This appears to me a very distinct group, characterised by (*a*) the very broad and blunt apex of the saw, (*b*) the very slight and inconspicuous separation of the cutting edges, (*c*) the fact that these cutting edges form an almost continuous line and are not placed as usual more or less *en échelon*, (*d*) the very close and regular denticulation of these cutting edges, even those quite near the apex of the instrument, (*e*) the *straightness* of these edges—neither concave nor convex.

Most of these peculiarities are to be found also in *gonager* and *niger*, but those species have a much less broad and more pointed apex than in *gibbosus*, *megapterus*, etc. (Plate XXV, 8 to 12), and on that account I do not actually include them in the *gibbosus* group, but prefer to treat them rather as forming a transition towards it.



F. D. Morice, photo.

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